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10/655,920	09/05/2003	Hassan Mostafavi	VM7031422001	8620
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EXAMINER LAURITZEN, AMANDA L				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/655,920

**Applicant(s)**

MOSTAFAVI, HASSAN

**Examiner**

Amanda L. Lauritzen

**Art Unit**

3737

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 and 31-66 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 and 31-66 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SI/08)  
Paper No(s)/Mail Date 02 February 2009
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This action is in response to communications filed 28 January 2009. Rejection of system claims 10-14, 34-39 and 55-57 invoking 1122, 6<sup>th</sup> paragraph with means-plus-function language as being directed to nonstatutory subject matter has been withdrawn in view of the remarks regarding those claims. Rejection of claims 1-29 and 31-63 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-53 of US 6,690,965 has been withdrawn.

### ***Response to Arguments***

Applicant's arguments with respect to the provisional rejection of claims 1-29 and 31-63 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over copending Application No. 10/656,478 and unpatentable over copending Application No. 10/678,741 have been fully considered but they are not persuasive. Regarding Application No. 10/656,478, the current claims are broader and are therefore anticipated by the conflicting claims. Each claim set is directed to acquiring an image or images of a target, forming a composite based on subtraction imaging and comparing to a template. The current claims are broader in that they do not prescribe feature enhancement, but enhancing to emphasize motion of a structure is inherent in gating based on a difference image in the current claims. That an image is acquired in real-time is held to be an obvious feature over the conflicting claims. Regarding Application No. 10/678,741, the synchronizing step(s) and generation of an image based on the synchronizing is interpreted as gating with the medical procedure of the conflicting claims being generation of an additional image.

Applicant's arguments with respect to rejection of claims 1-29 and 31-63 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-27 of US 6,959,266 have been fully considered but they are not persuasive. It is understood that the method prescribed by the conflicting claims is at least partially performed using a processor and providing that one of the images is acquired in real-time is an obvious feature over the conflicting claims. The first and second sets of data on which a comparison is made for gating application of radiation is likened to the comparison made between first and second images when a composite image is generated on which gating is based in the current application.

Applicant's arguments with respect to rejection of claims 1-29 and 31-63 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of US 6,937,696 have been fully considered but they are not persuasive. It is understood that the method prescribed by the conflicting claims is at least partially performed with a processor and providing that one of the images is acquired in real-time is held to be an obvious feature over the conflicting claims. The matching of the conflicting claims is likened to the template provided in the current claims.

Applicant's arguments with respect to rejection of claims 1-29 and 31-63 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-28 of US 6,621,889. It is understood that the method of the conflicting claims is at least partially performed with a processor and providing that one of the images (or sets of data of the conflicting claims) is acquired in real-time is held to be an obvious feature over the conflicting claims. The pattern matching of the conflicting claims is likened to the alignment of image data necessary in forming the composite image of the current claims.

Applicant's arguments with respect to rejection of claims 1-9, 64, 15-23, 66, 24-29, 31-33, 40-48, 49-54, and 58-63 as being directed to nonstatutory subject matter have been considered but they are not persuasive. Step(s) have been incorporated to set forth that one of the first and second images is a real-time image, but no corresponding apparatus acquiring the image is recited in the claims. Additionally, the processor set forth in the preamble, as applicable to claims 1, 15, 24, 31, 40, 49 and 58, does not positively set forth sufficient link to an apparatus and it is understood that what is recited in the body of the claim(s) can be accomplished as a purely mental process.

Applicant's arguments with respect to rejection of the claims under 35 U.S.C. 103 as being obvious over Kaufman et al. in view of Takeo have been fully considered but they are not persuasive. The gating is based on a real-time image such that the user "can rapidly assess the adequacy of the timing selection" of the images (at col. 8, lines 12-14). The act of gating is based on at least one real-time image (col. 8, lines 15-57; also col. 9, lines 10-21; col. 13, line 65 – col. 14, line 58, in which gating is performed based on images that are acquired in real time). Additionally, it is not prescribed by the claim that the medical procedure is gated in real-time; only that this gating is based on a real-time image and Kaufman et al. clearly teach this feature. Kaufman is relied upon to teach gating based on a real-time image and Takeo is relied upon to modify Kaufman to include the specifics of the subtraction imaging and composite image formation. The combination of Kaufman and Takeo substantially teaches all limitations of the claimed invention.

Regarding claims 24, 34 and 40 and the amendment to include that a template corresponds to a phase of a physiological cycle, Kaufman teaches synchronizing with respect to

phases of the cardiac cycle, which implies a template to align the characteristic phases (col. 8, lines 8-12; also col. 10, lines 57-61 for slice alignment with the R-R cycle). Template matching is additionally inferred from the monitoring of duration of the R-R cycle (col. 11, lines 33-43).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1-29 and 31-66 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Independent claims have been amended to recite that one of the first and second images is a real time image “with respect to the act of gating the medical procedure,” but this feature is not set forth in applicant's specification.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. Claims 1-9, 64, 15-23, 66, 24-29, 31-33, 40-48, 49-54 and 58-63 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. In order for a process claim to be patentable under 35 U.S.C. 101, it must be tied to another statutory

class (such as a particular apparatus), or transform underlying subject matter (such as an article or materials) to a different state or thing. The claim(s) must positively recite the thing or product to which the process is tied, for example, by identifying the specific apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example, by identifying the material that is being changed to a different state (see *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385, Fed. Cir. 2008).

In this case, the claims do not positively recite use of a particular apparatus to carry out the step(s) of providing a real-time image, as there is not recitation of any image acquisition apparatus. Additionally, the processor set forth in the preamble, as applicable to claims 1, 15, 24, 31, 40, 49 and 58, does not positively set forth sufficient link to an apparatus and it is understood that what is recited in the body of the claim(s) can be accomplished as a purely mental process. For these reasons, there is not sufficient tie of the claimed subject matter to another statutory class.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned

with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 1-29 and 31-63 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 and 7-63 of copending Application No. 10/656,478. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claim sets are directed to gating a medical procedure based on an image (and/or composite image), with method steps and system components that are identical or obvious variants. It is noted that the instant claims do not specify determining a position of a target region, but based on the conflicting application it is clear that this is accomplished based on the resulting composite subtraction image.
2. Claims 1-29 and 31-63 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 33-43 and 44-49 of copending Application No. 10/678,741. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claim sets are directed to gating a medical procedure based on an image or, in the case of the conflicting claims, based on first and second data signals, which encompasses images.

The above (sections 2 and 3) are provisional obviousness-type double patenting rejections because the conflicting claims have not in fact been patented.

3. Claims 1-29 and 31-63 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-27 of US 6,959,266. Although the conflicting claims are not identical, they are not patentably distinct because the conflicting

claims are directed to gating radiation therapy based upon first and second sets of data, which encompasses first and second images as in the instant claims.

4. Claims 1-29 and 31-63 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-48 of US 6,937,696. Although the conflicting claims are not identical, they are not patentably distinct because the conflicting claims are directed to gating radiation therapy based upon first and second sets of data, which encompasses first and second images as in the instant claims. Additionally, the conflicting method is executed in the context of a computed tomography procedure, as in the preamble of claim 1, so it is reasonably assumed that the first and second sets of data as claimed, could correspond to first and second tomographic image datasets.

5. Claims 1-29 and 31-63 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-28 of US 6,621,889. Although the conflicting claims are not identical, they are not patentably distinct because the conflicting claims are directed to gating radiation therapy based upon first and second sets of data, which encompasses first and second images as in the instant claims.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. (US 7,006,862) in view of Takeo (US 6,125,166).

Kaufman discloses a system and associated method in which radiation therapy is gated by an ECG signal, that involves at least first and second real-time images and forming a composite image with thresholding pixel (contrast) values in the activation/deactivation of a therapeutic radiation (abstract; Fig. 16; col. 5; col. 14; col. 20, lines 16-23; col. 3, lines 32-45; col. 8, lines 8-14; col. 13, lines 24-33; col. 2, lines 57-64; col. 9, lines 10-17; inter alia). Kaufman et al. do not expressly teach conducting a subtraction operation among images, but where Kaufman is deficient, Takeo establishes what is conventional within the skill of the art. Takeo discloses a method of forming energy subtraction images and discloses using contrast values to determine threshold values (col. 1, lines 50-64 for the subtraction process; also col. 19, lines 11-28 in which a contrast value is used). It would have been obvious to use a contrast value of the image for reference as taught by Takeo in the system of Kaufman et al. for determining a threshold value in the gating of a procedure, as contrast image data allows for extraction of a specific image structure that would be receiving treatment (for motivation, see Takeo at col. 2, lines 23-24).

2. Claims 24-29, 32, 33, 34-39, 40-48 and 49-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. in view of Takeo, as applied in section 1 above, further in view of Fitzgerald (US 2005/0027196).

Kaufman et al. as appended by Takeo includes all features of the invention as substantially claimed, including enhancing a moving object except for providing templates that include both image and radiation treatment data. In the same field of endeavor, Fitzgerald teaches where Kaufman and Takeo are deficient – specifically providing templates, records or what is generally known as a radiation treatment plan that prescribes imaging information and information related to radiation therapy [0012], [0023]. The templates of the claims is corresponded to the treatment planning records of Fitzgerald. The treatment planning record includes both image and treatment data [0012]. Additionally, [0014] presents that treatment plans include a visual representation of the radiation dose distribution (an image), with the dose being treatment data. Multiple radiation plans are disclosed at [0023]. It would have been obvious to one of ordinary skill in the art at the time of invention to provide templates specific to both the imaging and radiation therapy protocol for the purpose of planning guided treatment, as taught by Fitzgerald.

Regarding claims 49-66, Fitzgerald teaches tracking the position of a target area in that the treatment planning accommodates tracking the location and disposition of a radiation beam with respect to a target anatomical area [0022]. The position of sources is verified with an imaging step [0023]. It would have been obvious to one of ordinary skill in the art at the time of invention to include position tracking in the radiation therapy gating scheme of Kaufman et al. as appended by the image subtraction scheme of Takeo as taught by Fitzgerald. Additionally, the

method of Kaufman et al. is specific to synchronizing with respect to phases of the cardiac cycle, which implies a template to align the characteristic phases (col. 8, lines 8-12; also col. 10, lines 57-61 for slice alignment with the R-R cycle). Template matching is additionally inferred from the monitoring of duration of the R-R cycle in Kaufman et al. (col. 11, lines 33-43).

3. Claims 49-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. in view of Takeo, as applied in section 1 above, further in view of Verard et al. (US 2004/0097805).

Kaufman et al. as appended by Takeo includes all features of the invention as substantially claimed, including enhancing a moving object except for providing templates that include both image and treatment data. In the same field of endeavor, Verard et al. disclose registration images with templates (para. 112 and para. 132 in which templates provide treatment data that includes lead placement and para. 146 for templates that provide therapy effective zones). It would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated template registration as taught by Verard et al. with the system of Kaufman et al. in order to optimize the procedure (for motivation, see Verard para. 146). Takeo et al. teach image averaging for the purpose of smoothing an image (col. 13, lines 36-46). It would have been obvious to incorporate image averaging as taught by Takeo with the modified system of Kaufman et al. in order to smooth images in the sequence. Features in the depending claims are clearly taught in the references applied or are considered to be obvious within the skill of the art.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amanda L. Lauritzen whose telephone number is (571)272-4303. The examiner can normally be reached on Monday - Friday, 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Amanda L. Lauritzen/  
Examiner, Art Unit 3737

/BRIAN CASLER/  
Supervisory Patent Examiner, Art Unit  
3737